ISSN (print) 0093-4666 © 2013. Mycotaxon, Ltd. ISSN (online) 2154-8889

MYCOTAXON

http://dx.doi.org/10.5248/124.45

Volume 124, pp. 45–50 *April–June 2013*

Polycoccum anatolicum sp. nov. on *Lepraria incana* and a key to *Polycoccum* species known from Turkey

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Abstract — *Polycoccum anatolicum* is described as new from the thallus of *Lepraria incana* on the trunk of a *Prunus* sp. in western Turkey and represents the first *Polycoccum* known to occur on *Lepraria*. The new species is typical with its relatively small subglobose ascomata and verruculose relatively large ascospores. It is compared with similar *Polycoccum* species, and a key to *Polycoccum* species known from Turkey is provided.

Key words — *Ascomycota*, lichens, lichenicolous fungi, biodiversity

Introduction

Polycoccum Saut. ex Körb. comprises approximately 50 species of lichenicolous fungi (Halıcı et al. 2007a, 2009; Brackel & Berger 2010; Zhurbenko 2010). The type species of the genus is *P. sauteri* Körb. with lichenicolous habit on *Stereocaulon condensatum* Hoffm. Species are characterized by dark perithecioid ascomata, pseudoparenchymatous exciple, fissitunicate asci with brown one-septate ascospores, and a hamathecium of persistent, branched and anastomosing interascal filaments. Following the genus synopsis by Hawksworth & Diederich (1988), Atienza et al. (2003) recognized 37 species. Brackel & Berger (2010) described three *Polycoccum* species occurring on the lichenised fungus *Placopsis*.

Attention to the lichenicolous fungi of Turkey has increased since Halıcı (2008) published the key to the lichenicolous *Ascomycota*. Of the 181 lichenicolous species known from Turkey (Halıcı et al. 2012), ten *Polycoccum* species have been identified (Halıcı 2008, Halici et al. 2009; Yazıcı et al. 2011). In 2012, the second author (EA) collected an interesting specimen of *Polycoccum* on epiphytic *Lepraria incana* (L.) Ach. s. lat. from Turkey's Mediterranean

Region. After comparison with the described species of the genus, we concluded that the specimen represents a new species, which we describe here. We also provide a key to the eleven *Polycoccum* species now reported from Turkey.

Material & methods

The type of the new species is deposited in Erciyes University Herbarium Kayseri, Turkey (EUH). Sections were prepared by hand and examined in I [Lugol's iodine (MERCK 9261) with (KI) and without (I) pre-treatment with 10% KOH], 10% KOH, and water. Ascospores were measured in water. Ascospore measurements are given as: (min –) X–sd – *X* – X+sd (–max.), where 'min.' and 'max.' are the extreme values, 'X' the arithmetic mean, and 'sd' the corresponding standard deviation. The length/breadth ratio of ascospore is indicated as l/b and given in the same way. The microphotographs were taken with a Leica DFC 420 digital microscope camera with a c-mount interface and with a 5 megapixel CCD. The descriptive notes provided in the key are based on Turkish specimens examined by the first author (MGH), except for *Polycoccum evae,* which is based on the description given by Calatayud & Rico (1995).

Taxonomy

Polycoccum anatolicum Halıcı & E. Akgül, **sp. nov.** FIGURE 1

MycoBank MB804154

Differs from *Polycoccum dzieduszyckii* by its 8-spored asci and its *Lepraria* host.

TYPE: Turkey, Isparta, Sütçüler, Yazılı Canyon, 41°48′N 36°31′E, alt. 290 m, on *Lepraria incana* on *Prunus* sp., 18 July 2012, E.Akgül (**Holotype**, EUH (MGH 0.3118)).

ETYMOLOGY: The epithet refers to Anatolia, the Asian part of Turkey, where the type specimen was collected.

Vegetative hyphae hyaline, scant, very narrow, the infection causing no visible necrosis in host, but eventually bleaching the infected parts. Ascomata perithecioid, subglobose, arising singly, in the early stage immersed with only the ostiole area visible, semi-immersed at maturity, 75–90 µm. Ascomatal wall dark reddish brown, darkest in the upper half, 10–15 µm thick, and thickening in the ostiole region; composed of several layers of compressed cells, 10–15 × 6–8 µm, forming a textura angularis. Hamathecium consisting of septate, branched and anastomosing pseudoparaphyses, 1–2 µm thick. Hymenial gelatin K/I–, I–. Asci arising from the lower part of the ascomatal cavity, cylindrical to elongate-clavate, shortly stalked, bitunicate, the apex thickened, 8-spored, (71–)83–91(–103) × (11–)14–18(–21) µm (n = 10); wall I–, endoplasm dextrinoid. Ascospores monostichously arranged in the asci, sole-shaped, apices rounded, some tending to taper towards the rounded ends, 1-septate, not or slightly constricted at the septum, upper cell slightly larger, brown, verruculose, non-halonate, some ascospores multi-guttulate, (25–)26–*28*–29.5(–32) × (8.5–)9–*10*–11(–13) µm (n = 30), l/b = (2.2–)2.52–*2.76*–3(–3.3). Conidiomata not seen.

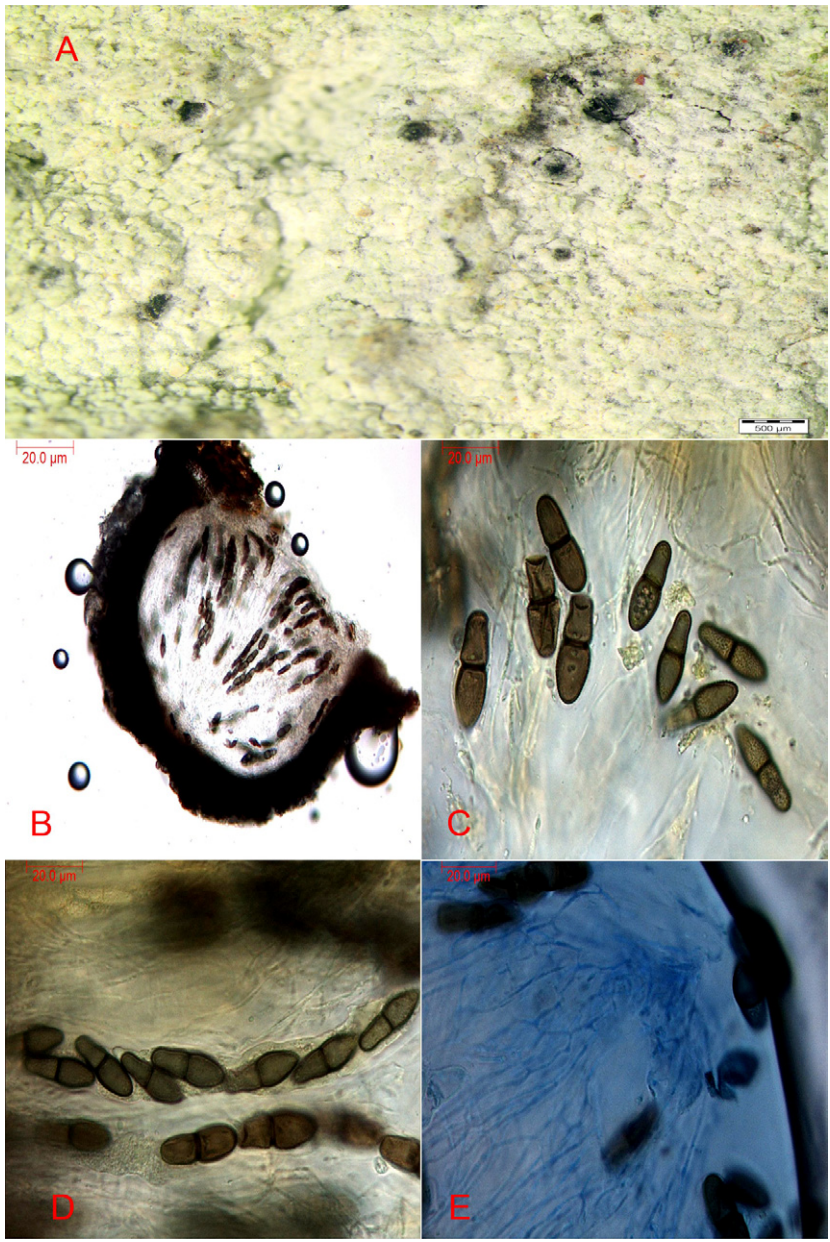

Fig. 1. *Polycoccum anatolicum* (Holotype): A, Habitus; B, Ascoma (in water); C, Ascospores (in water); D, Asci showing monostichously arranged ascospores (in water); E, Anastomosed pseudoparaphyses (in methylene blue).

Ecology & distribution: *Polycoccum anatolicum* is currently known only from the type locality in the Western Mediterranean part of Turkey. The new species was collected on *Lepraria incana* on the trunks of *Prunus* sp. The species seems to be weakly pathogenic as moderate bleaching was observed in the infected parts of the host thallus. As the host lichen has a wide distribution, *P. anatolicum* may also have a wide distribution.

Notes: Most *Polycoccum* species are confined to one host species or genus, and *P. anatolicum* is the only species known to occur on *Lepraria*. It is closest to *P. dzieduszyckii* (Boberski) D. Hawksw., a species known only on *Verrucaria* spp. (and probably other lichens on limestone). *Polycoccum dzieduszyckii* has small ascomata (50–100 µm) and large verruculose ascospores (25–35(–44) × 8–10(–14) µm) (Hawksworth & Diederich 1988, Halıcı et al. 2007b), but clearly differs from *P. anatolicum* in having consistently 2-spored asci and infecting a different host genus.

Polycoccum opulentum (Th. Fr. & Almq.) Arnold, a species known on *Polyblastia intercedens* (Nyl.) Lönnr., *Lecidea plana* (J. Lahm) Nyl., and a sterile lichen on calcareous rocks, has similar sized ascospores (25–28 × 11–14 µm) but thicker pseudoparaphyses (3 µm), larger ascomata (100–170 µm), and hymenial gelatin turning blue in iodine (Hawksworth & Diederich 1988; Atienza et al. 2003). *Polycoccum squamarioides* (Mudd) Arnold, another species known on *Placopsis* spp., has similar sized ascomata (75–100 µm) but narrower ((18–)19–26 × (5.5–)6–7(–8) µm) and smooth-walled ascospores (Hawksworth & Diederich 1988, Brackel & Berger 2010). *Polycoccum evae* Calat. & V.J. Rico is restricted to *Dimelaena oreina* (Ach.) Norman and has larger ascomata (100–200 µm) and shorter verruculose ascospores ((17–)18–23(–25) × (6–)7–10(–11) µm) (Calatayud & Rico 1995). *Polycoccum crassum* Vězda, a species known on *Peltigera* spp., has similar sized verruculose ascospores ((25–)30–32(–36) × 8–10(–11) µm) but much larger ascomata (300–500 µm) and consistently 4-spored asci (Hawksworth & Diederich 1988; Atienza et al. 2003; Halıcı et al. 2012).

A key to the *Polycoccum* species known from Turkey

1.	Ascospores <20 µm long	**2**
1.	Ascospores >20 µm long	**5**
2.	Ascospores smooth walled	**3**
2.	Ascospores verruculose, 13–14 × 6 µm, on *Acarospora* spp.	***P. microsticticum***
3.	Not causing swellings on the host lichens	**4**
3.	Ascomata c. 200 µm, causing swellings on the host lichens. Ascospores 14–18 × 5–6 µm, on *Peltigera* spp.	***P. peltigerae***

4. Ascomata 100–140 µm. Interascal filaments very thin, c. 1.0 µm. Ascospores (11–)12–14.5(–15.5) × (4.5–)5–6 µm, on *Xanthoria* sp. on coastal rocks ..... ***P. teresum***

4. Ascomata 150–235 µm. Interascal filaments thicker. Ascospores (11–)13.5–15(–16) × 6.5–7 µm, on *Aspicilia cinerea* ..... ***P. aksoyi***

5. Asci >2-spored **6**

5. Asci 2-spored. Ascospores verruculose, 25–28 × 8–11 µm, on endolithic *Verrucaria* spp. on hard calcareous rocks ..... ***P. dzieduszyckii***

6. Asci >4-spored **7**

6. Asci 4-spored. Ascomata c. 400 µm. Hymenial gelatin I+ orange-red. Ascospore cells ± equal in size, verruculose, 24–30 × 8–10 µm, on *Peltigera* spp. ..... ***P. crassum***

7. Ascomata >100 µm **8**

7. Ascomata 75–90 µm. Hymenial gelatin I–. Ascospores verruculose, (25–)26–29.5(–32) × (8.5–)9–11(–13) µm, on *Lepraria incana* ... ***P. anatolicum***

8. Hymenial gelatin I– **9**

8. Ascomata c. 220 µm. Hymenial gelatin I+ blue. Ascospores verruculose, 24–27 × 10–13 µm, on endolithic *Verrucaria* spp. ..... ***P. marmoratum***

9. Ascospores verruculose and cells ± equal in size **10**

9. Ascomata 170–200 µm. Ascospores smooth walled and lower cell often attenuate, 22–23 × 10 µm, on *Sporastatia testudinea* ..... ***P. sporastatiae***

10. Ascomata 100–200 µm. Ascospores (17–)18–23(–25) × (6–)7–10(–13) µm, on *Dimelaena oreina* ..... ***P. evae***

10. Ascomata 180–250 µm. Ascospores (25–)28.5–31.5(–34) × (7–)8–9.5 µm, on *Acarospora cervina* ..... ***P. acarosporicola***

Acknowledgements

The manuscript was reviewed by Kerry Knudsen (USA) and Wolfgang von Brackel (Germany). This study was financially supported by the Selçuk University Scientific Research Project Coordinator with the project coded (BAP-12101025).

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